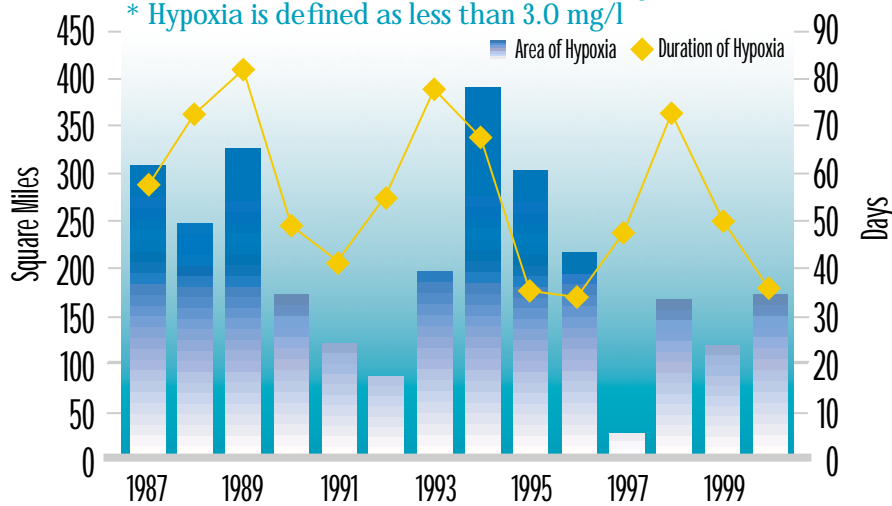


## Maximum Area and Duration of Hypoxia\*

\* Hypoxia is defined as less than 3.0 mg/l



CT DEP, LIS Water Quality Monitoring Program

## Dissolved Oxygen Levels

The severity of hypoxia depends on the area affected, how long the condition persists, and how low the oxygen levels dip. Weather conditions influence the severity of hypoxia from year to year, but taken together, in terms of area, duration, and intensity, the severity of hypoxia has decreased since the late 1980s. Continued monitoring is necessary to observe how the Sound will respond to continued reductions in nitrogen.

The maximum area of hypoxia has averaged 206 square miles from 1987 through 2000, with a low of 30 square miles in 1997 and a high of 395 square miles in 1994. The duration of hypoxia has averaged 56 days during that same period, with a low of 34 days in 1996 and a high of 82 days in 1989.

## Biological Nutrient Removal (BNR)

The dominant source of human-caused nitrogen loadings is from sewage treatment plants (STPs). Historically, conventional STPs removed oxygen-demanding solids from the wastewater. Now, STPs are being upgraded using an advanced technology called biological nutrient removal (BNR) to also remove nitrogen from the wastewater.

Since 1990, 25 percent of the STPs have been upgraded to include BNR. In some cases, BNR can be added to existing STPs with minor modifications and at a low cost. However, to achieve the ambitious levels of nitrogen reduction needed to alleviate hypoxia, many STPs will need to be reconstructed at a cost of several hundred million dollars.

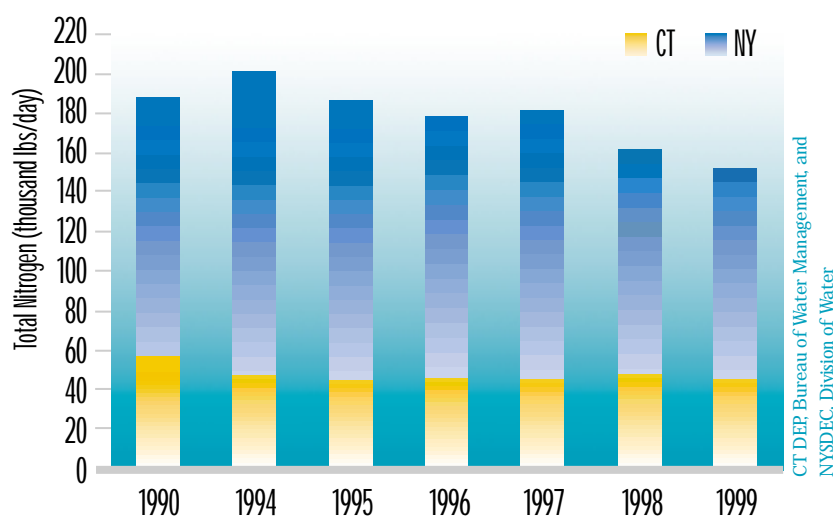
## BNR Treatment



EPA New England

\* There are 105 STPs in Connecticut and New York that discharge into the Sound or its tributaries. BNR systems to remove nitrogen are being phased in at selected STPs.

## Point Source Nitrogen Load



CT DEP, Bureau of Water Management and  
NYSDEC, Division of Water

## Point Source Nitrogen Loads

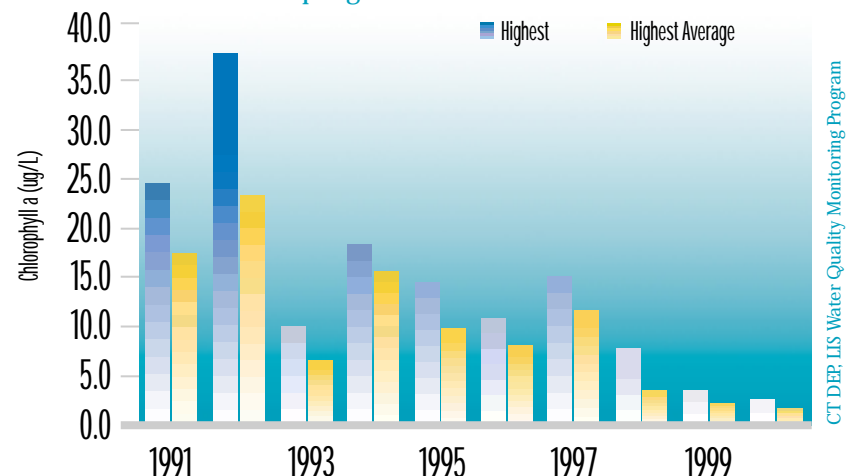
As a result of BNR upgrades to STPs, there has been a reduction of 19.2 percent in nitrogen loading to Long Island Sound from STPs over the past ten years.

## Chlorophyll-a Levels

The concentration of chlorophyll-a, the green pigment in phytoplankton, is used to measure the levels of phytoplankton in surface water. Reducing the amount of nitrogen entering the Sound is expected to reduce chlorophyll-a levels, improve water clarity, and increase oxygen levels. For western Long Island Sound, the most sensitive region of the Sound, chlorophyll-a levels during the winter/spring bloom declined from 1991-2000.

## Chlorophyll-a in Western LIS

Winter/Spring bloom



CT DEP, LIS Water Quality Monitoring Program